

OEHHA's Protocol for Updating Fish Advisories¹

The purpose of this report is to describe the process the Office of Environmental Health Hazard Assessment (OEHHA) used to update existing fish advisories. Two factors prompted the update procedure: 1) advisory tissue levels, or ATLs, and 2) new chemical data for fish from California water bodies with advisories. OEHHA included the updated advisories in the California Department of Fish and Game 2009 Sport Fishing Regulations booklets—published in spring 2009. Not all advisories were updated at this time. Updated advisories are also posted on OEHHA's Web site (http://www.oehha.ca.gov/fish/so_cal/index.html).

Advisory Tissue Levels (ATLs)

OEHHA's fish advisories are also called "safe eating guidelines." They provide information to fish consumers in California to assist them in choosing to eat fish low in contaminants and high in beneficial fats. OEHHA developed ATLs for evaluating fish tissue data and developing advisories. ATLs were determined after several steps.

Safe Exposure Thresholds

First, OEHHA established limits for exposure to common chemicals in fish based on a review of the toxicity of these chemicals. OEHHA used these safe exposure thresholds to develop the ATLs. OEHHA applies ATLs to measured levels of chemicals in fish to determine how much fish can be safely eaten.

Benefits of Eating Fish

Second, OEHHA reviewed studies that showed regular fish consumption—such as twice a week—provides many types of health benefits. ATLs were thus designed to achieve two outcomes that support public health:

1. Discourage eating fish that cannot be eaten often because of chemical contamination
2. Encourage consumption of fish that can be safely eaten in amounts likely to confer health benefits

Improving Communication

Third, OEHHA took into account principles of good communication when developing the ATLs. For example, ATLs simplify advice by limiting the number of possible recommendations. The ATLs identify the cutoff for fish that cannot safely be eaten at least once a week. OEHHA uses the ATLs to organize fish with different chemical levels into high, medium, and low level groups.

OEHHA also worked with the California Department of Public Health to simplify advisories and improve their design.

¹ 2009 Update of Fish Advisories, Office of Environmental Health Hazard Assessment (OEHHA), March 2009 ([url](#) for full report)

For further information on ATLs and the toxicology of common chemicals in fish, see the June 2008 OEHHHA report² by Klasing and Brodberg at:
<http://www.oehha.ca.gov/fish/gtlsx/cmr062708.html>.

New Data for Fish from California Water Bodies

OEHHHA got new data on mercury and other chemicals in fish from several sources.

(1) The California Surface Water Ambient Monitoring Program (SWAMP)

This program collected mainly largemouth bass, but also several other fish species, from lakes throughout California in 2007. In addition to mercury, SWAMP analyzed some samples for selenium and chlorinated hydrocarbon contaminants.

(2) The Fish Mercury Project (FMP)

The California Bay-Delta Authority funded researchers from several organizations to study mercury in the Central Valley. Fish samples were collected for three years, 2005 – 2007. (See <http://www.sfei.org/cmr/fishmercury/> for more information on this project.)

(3) The United States Geological Survey (USGS)

USGS provided fish data to OEHHHA from studies of mercury at several water bodies.

(4) The City of Benicia

The City of Benicia sampled fish from a local water body in 1998 and tested them for mercury.

OEHHHA combined new data with data staff previously used to develop safe eating guidelines. OEHHHA then evaluated the combined dataset—using the ATLs—to update the existing safe eating guidelines.

Information about SWAMP Data

SWAMP collected a range of sizes of largemouth, smallmouth, and spotted bass including individual fish that did not meet legal requirements for minimum size. Although SWAMP included sub-legal sized bass in composite samples they analyzed for mercury, OEHHHA did not evaluate samples with bass smaller than legal size.

SWAMP analyzed some fish species for these chlorinated hydrocarbon contaminants: chlordane, dieldrin, DDTs, PCBs, and PBDEs. This report will refer to this group of chemicals as “organics” for simplicity. The following acronyms stand for these chemicals groups:

- DDTs = dichlorodiphenyltrichloroethane and its main metabolites
- PCBs = polychlorinated biphenyls
- PBDEs = polybrominated diphenylethers.

² This report is titled “Development of Fish Contaminant Goals and Advisory Tissue Levels for Common Contaminants in Sport Fish: Chlordane, DDTs, Dieldrin, Methylmercury, PCBs, Selenium, and Toxaphene.”

For information about these chemicals and their toxicity, see the OEHHA report³ by Klasing and Brodberg (2008).

Internal Guidelines for Consistency

A major goal in updating the advisories was to make current, and future, advisories consistent. OEHHA developed and used the following guidelines for that purpose.

Sample Size

OEHHA issues advice for fish or shellfish species only when there are enough samples to evaluate.

- OEHHA requires at least nine individual fish from a species at a water body to issue advice for that species.
- An exception can apply to a few fish species commonly known to build up high levels of mercury.
 - Examples include largemouth bass and Sacramento pikeminnow.
 - When at least five individuals, but less than nine, of one of these species were sampled at a water body, OEHHA will consider giving advice for that species.
 - OEHHA will compare mercury levels in that species and others from the same water body that build up mercury. OEHHA will consider giving the same advice for both species.

Related Species

Closely related species can be hard to tell apart, and often have similar levels of contamination. OEHHA used these guidelines to simplify advice for related species.

- Closely related species are evaluated together as a group.
- Examples of closely related species are:
 - Black bass—largemouth, smallmouth, and spotted bass
 - Sunfish—bluegill, redear, and green sunfish
- The species group must contain at least nine individual fish of two or more of the related species.
- An average chemical concentration of all fish in the species group is used for the group. The average is weighted by the number of individual fish per species.
 - For example, the average chemical level measured in a composite of ten fish from one species would count ten times more than the level in one fish sampled from a second species.

³ Development of Fish Contaminant Goals and Advisory Tissue Levels for Common Contaminants in Sport Fish: Chlordane, DDTs, Dieldrin, Methylmercury, PCBs, Selenium, and Toxaphene

Balancing Risks and Benefits

OEHHA recommends eating fish species known to have high levels of beneficial fats—omega-3 fatty acids—that can provide health benefits to consumers. OEHHA will consider the omega-3 content of fish species when its chemical level is close to the border between two consumption recommendations.

- If the species has high levels of omega-3 fatty acids, OEHHA will consider recommending the greater amount of consumption.
- When omega-3 levels are low, or unknown, OEHHA will consider giving the more restrictive recommendation.

Keeping Communication Simple

Safe eating guidelines are matched to a familiar color code scheme as follows:

- Fish with high mercury levels are shown in a red category
- Fish with medium mercury levels are shown in a yellow category
- Fish with low mercury levels are shown in a green category

When the advice differs for species within the same category, OEHHA may make minor changes for some species to keep the safe eating guidelines simple and easier to follow. For example, OEHHA may choose the most restrictive advice, the most common, or an average of possible recommendations within the category. In these cases, OEHHA considers specific factors for each situation.

The process OEHHA used to update the safe eating guidelines presented in this report can also serve for developing consistent advisories in the future. By using the ATLs to evaluate all fish data and following the internal guidelines described above, OEHHA can provide more uniform advice for eating fish.

Updated Advice for Trinity Lake and the East Fork Trinity River (Trinity County)

The updated safe eating guidelines for Trinity Lake and the East Fork Trinity River included new data. More information about this updated advisory is given below.

New data: SWAMP collected four additional composite samples of rainbow trout (including a total of 20 trout) from Trinity Lake in 2007.

- The samples were analyzed for mercury, selenium, and organics. None of the organics, or selenium, was at a level of health concern.
- The mercury results were combined with those from previous samples of rainbow trout, brown trout, and brook trout.
- OEHHA evaluated the combined data, using the ATLs, to update the advisory.

Related species: OEHHA grouped the following related species:

- Bass: largemouth and smallmouth bass
- Catfish: white catfish and bullhead catfish
- Trout: rainbow, brown, and brook trout

Sample size: Fish species with insufficient sample sizes (less than a minimum of nine individuals) were not included in the safe eating guidelines:

- Two chinook salmon
- Two green sunfish

Table 1 shows average mercury concentrations for all fish samples from Trinity Lake and the East Fork Trinity River used in the updated safe eating guidelines.

Table 1. Average Mercury and Size in Fish from Trinity Lake and East Fork Trinity River

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Bass	47	0.47	354
Catfish	35	0.11	293
Trout	76	0.12	293

Note: In the updated advisories, OEHHA issued separate safe eating guidelines for **Lewiston Lake, Carrville Pond, and the Trinity River upstream of Trinity Lake**. Previously, these three water bodies were included with the advisory for Trinity Lake.